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ABSTRACT

This paper contends that there is a range of converging evidence that beginning readers use the implicit lexicalized form of phonological recoding, as claimed by the knowledge sources theory. To reinforce the contention, the paper first discusses the alphabetic principle and theories of beginning reading and then considers lexicalized phonological recoding in the knowledge sources theory. It then questions whether there is empirical research evidence about this claim of the knowledge sources theory and answers by citing findings from several studies of beginning readers which support the theory. The paper concludes that the knowledge sources theory explains how beginning readers can progress in very diverse instructional environments and that the knowledge sources theory provides an expanded view of children's acquisition and use of the alphabetic principle. Contains 15 references. (NKA)

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by G. Brian Thompson

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A Theory of the Fundamentals of Beginning Reading Acquisition

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1. **The alphabetic principle and theories of beginning reading.** According to the standard view, the *alphabetic principle* is that "letters systematically map onto phonemes". Theories of reading acquisition should include an account of how children acquire and use this principle. Commonly accepted theories, e.g., Share (1995), imply that in beginning to read the child needs *explicitly taught phonological recoding*, "sounding out" that uses taught sounds for letters, to enable attempts at reading unfamiliar words. These theories also claim that phoneme awareness is involved in the acquisition of such phonological recoding procedures.

2. **Lexicalized phonological recoding in the Knowledge Sources theory.** Included in the recent Knowledge Sources theory (Thompson, 1999a; Thompson, Cottrell, & Fletcher-Flinn, 1996; Thompson & Fletcher-Flinn, 1993) is the claim that one of the five postulated sources of knowledge in beginning reading comes from interrelationships among the child's vocabulary of familiar reading words. This source gives rise to *lexicalized phonological recoding* which is a form of phonological recoding that involves all the patterns of relationships between letters and phonemes that children are able to implicitly induce from their reading vocabularies (among these, e.g., the print words *sit, said, see* have a common initial letter and sound; *sit, cat, not* a common final; and *ball, fall, wall* common final letters and sounds). Such patterns acquired in this way are called *induced sublexical relations* (ISRs). The claim is that the child potentially uses all these relationships between letters and phonemes, not just a selection of a few as in analogy procedures. Even with a very small vocabulary of familiar reading words, the number of these relationships that are potentially relevant to the child's attempt at reading an unfamiliar word is usually so large as to be beyond the capacity of the child's conscious attention. However, a child's nonconscious processing has the capacity to cope with such a vast collection of interrelationships. (Note that in the account of Share (1995) a vocabulary-based phonological recoding procedure is considered significant but only beyond the beginner stage of learning.) The Knowledge Sources theory includes the explicitly taught letter sounds as a potential source of knowledge for beginning reading. However, the theory implies that it is not a necessary source of knowledge. In the implicit lexicalized (vocabulary-based) source, the ISRs will provide another form of phonological recoding, for the child's attempts at using the alphabetic principle to read unfamiliar words.

3. **Evidence.** Is there empirical research evidence about this claim of the Knowledge Sources theory? There is some support from findings of independent research on beginning readers (Rack, et al., 1994; Stuart, et al., 1999). There are also five series of studies we have conducted with colleagues that provide converging evidence. These studies have included a range of instructional environments, from "whole language" to highly systematic explicit phonics; and a range of individual differences, from the extremely precocious reader of 3 years of age to severe developmental dyslexics.

4. The first series of studies (Thompson et al., 1996) was conducted with normal progress 5- and 6-year-olds in a whole-language instructional environment (New Zealand version, as described by Thompson, 1993). In such an environment without explicit phonics, the Knowledge Sources theory would predict that beginner readers would be mainly using implicit lexicalized (vocabulary-based) phonological recoding, for their attempts at reading unfamiliar words. We tabulated the vocabulary they were experiencing in their school reading material and found that, for example, words that ended in the letter *b* were extremely rare but words ending in *t* were common, as were words beginning with *b* and with *t*. The theory predicts that if vocabulary-based ISRs are being used as a source of knowledge by these beginners, then they would have much more reading difficulty with the letter *b* in the end position of totally unfamiliar items such as *ub* than they would with the letter *b* of *bu*, although no such differences would be expected for *ut* and *tu*, as the letter *t* was common in both initial and end positions of words in the children's reading experience. This prediction was confirmed. Moreover, the result was replicated in a second study of the series; and in the third study we directly manipulated the children's reading vocabulary by providing reading experience of several new words ending in the letter *b*, e.g., *crab, job*, etc. As predicted by the Knowledge Sources theory, this change in the children's vocabulary of familiar reading words enabled them to have much more success with the final *b* of unfamiliar items such as *ub* (relative to both a pronunciation-only control group and control items with initial and final *t*). Moreover, the particular pattern of results could not be explained by supposing that the children had learnt to make analogies from these new words.

5. In the second series of studies (Thompson, Fletcher-Flinn, & Cottrell, 1999) there were beginning readers of 5 and 6 years in the same instructional environment. They had been taught some letter names but not letter sounds. Consistent with the Knowledge Sources theory, their attempts at giving sounds for isolated letters depended on their reading vocabulary experience of the letter-sound relation (predominantly in the initial position of words), when the sound for the letter could not be deduced from the letter name. For example, the letter *h* occurred frequently as the initial letter of words in their reading experience but the letter *y* significantly less frequently. As predicted by the Knowledge Sources theory, the children were able to provide the correct sound for the letter *h* much more often than they could for the letter *y*. Note that the correct sounds for the letters *h* and *y*

cannot be deduced from the names of these letters. Where the sounds for letters could be deduced from the name of the letter, the frequency of the letter in the children's reading experience of words had no influence. (For example, the children were highly accurate in providing the sounds for the letters *v* and *z*, and just as accurate as they were for *p*, a much more frequently occurring letter in their reading vocabulary experience.)

6. A second study of this series was conducted on selected consonant letters for which both letter name and reading vocabulary sources of knowledge competed strongly. These letters were placed in unfamiliar word-like items (e.g., *cu, gu*) and compared with the letters in isolation (e.g., *c, g*). As predicted by the Knowledge Sources theory, the lexical (vocabulary) influence was greater on the children's responses to the letters in the word-like items than to the letters in isolation. A third study indicated that the children's knowledge of phoneme-to-letter relations (as in spelling) did not account for the results on these letters in the first study of the series. This last finding is also noteworthy for being inconsistent with the argument that children not taught explicit phonics *do* receive explicit letter-phoneme knowledge for reading by means of spelling experience. This argument is the defensive position of the commonly accepted theories. It is a position that attempts to explain why beginning readers would progress at all, without instruction in explicit letter sounds which in such theories is required for phonological recoding.

7. By the Knowledge Sources theory, but not commonly accepted theories, it would be possible for the beginning reader to make very rapid progress in learning to read, using implicit lexicalized phonological recoding. This has been shown in our intensive studies of an extremely precocious reader from 2 to 5 years of age (Fletcher-Flinn & Thompson, 1999a, in press). Moreover, contrary to the expectation of commonly accepted theories, this child at 3 years of age reached an 8-year-old word reading level while her phoneme awareness and explicit knowledge of letter sounds were not beyond the 5-year-old level. At the opposite extreme of individual differences, our study of a sample of 8-year-old severe developmental dyslexics (Fletcher-Flinn & Thompson, 1999b) has shown they had deficiences in implicit lexicalized phonological recoding, relative to reading level controls (5-year-old level). At the same time, their phoneme awareness and explicit knowledge of letter sounds had reached this control level.

8. According to commonly accepted theory, explicitly taught phonological recoding is a requirement of reading progress in beginners. Hence it would be expected that groups of beginning readers who are making normal progress and are equal in word reading attainment would also be equal in explicitly taught phonological recoding. Such phonological recoding is commonly assumed to be measured by the child's reading of nonwords (e.g., *bup, plam*). Contrary to expectation, a sample of 5- and 6-year-olds who received no explicit phonics instruction were poor at nonword reading, compared with a sample of equal word reading attainment who had received highly systematic explicit phonics instruction

(Connelly, Johnston, & Thompson, 1999). However, the non-phonics sample was faster at reading text and more accurate at reading words with irregular spellings (e.g., *both, great*). In a study of 7-year-old phonics and non-phonics samples which were also matched on word reading level (Thompson & Johnston, in press) the non-phonics children were similarly poor at nonword reading. Furthermore, in similar samples of 8-year-olds, Johnston, Thompson, et al. (1995) showed that the children without explicit phonics, had deficiences in phonological recoding for isolated words but not when reading sentences for meaning. This set of findings is problematic for the commonly accepted theories in which beginners use only the explicitly taught form of phonological recoding but is explicable (Thompson & Johnston, in press) by the knowledge Sources theory which proposes that beginners have available a second kind of phonological recoding, the implicit lexicalized kind.

9. **Conclusions** (a) There is a range of converging evidence that beginning readers use the implicit lexicalized form of phonological recoding, as claimed by the Knowledge Sources theory.

(b) The Knowledge Sources theory explains how beginning readers can progress in very diverse instructional environments, a matter that is problematic for the commonly accepted theories.

(c) The Knowledge Sources theory provides an expanded view of children's acquisition and use of the alphabetic principle. First, it should be viewed as the principle that "letters *of words* systematically map onto phonemes *in words*" (Thompson,1997). Second, beginning readers should be expected to acquire it *as a principle*, rather than as just a specific set of letter-sound correspondences. Hence they should be expected to acquire untaught instances of the alphabetic principle by implicit self-teaching, or induction, of patterns of letter-phoneme relationships among the words of their accumulating reading vocabularies.

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